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ABSTRACT

Described is the Kirshner Saroj Visual Perception Speed Test (KSVPST), a measure of perceptual speed using pictures to identify children whose reading difficulties are due to visual processing deficiencies. It is explained that 323 children 6-13 years old were given the Keystone Visual Skills Test, the KSVPST, and reading readiness tests. Data are said to indicate that perceptual speed is significantly related to reading ability. The author suggests that visual training to increase perceptual speed should be considered as part of a total program for children with reading problems. Among seven appendixes is information on the validity and reliability of the KSVPST. (CL)

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KIRSHNER SAROJ VISUAL PERCEPTUAL SPEED TEST.

A test of visual readiness for reading.

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KIRSHNER SAROJ SPEED OF VISUAL PERCEPTION TEST

ABSTRACT

Gibson defined the reading process as involving several steps. (21)

1. Processing of the graphological features of letters
2. Distinguishing orthographic regularities of letter combinations
3. Phonological correlates of the letters
4. Semantic and syntactic attributes of words

The first two processes are visual in nature and the Kirshner Saroj Speed of Visual Perception Test seeks to determine the efficiency of this process in terms of rate. The targets used are thirty-five pictures of the hand, the child simply tells how many fingers are seen in each hand, the second target is thirty-five arrows pointed in the 4 cardinal directions, the child must say whether they point right-left-up-down. Studies show that these tests distinguish between the normal and the retarded reader to the .001 level of confidence.

The test is useful for the eye specialist who wishes to determine the effect of the eye measurements on the reading process and the reading teacher who wishes to determine whether her pupil must be referred for complete visual examination and visual training to remediate the reading problem. The test has been standardized on a normal school population in a mixed socioeconomic urban area in upper New York State.

KIRSHNER SAROJ VISUAL PERCEPTUAL SPEED TEST

The K S V P S T is a measure of perceptual speed using pictures. Gibson defined the reading process as involving several steps.

1. Processing the graphological features of letters
2. Distinguishing orthographic regularities of letter combinations
3. Phonological correlates of the letters
4. Semantic and syntactic attributes of words

The first and second steps are visual in nature. The efficiency of this visual process is the concern of the VISUAL PERCEPTUAL SPEED TEST. In order to succeed at reading, a student must not only know how to decode, but he must handle this process at a reasonable speed in order to gain meaning and comfort from this complex task. In the past remedial reading programs have concentrated on steps three and four of the Gibson structure. Naturally letter recognition was taught during this process, however, the speed of perception was left largely to chance or practice in reading. It is the object of this paper to show that children who fail in reading may have deficiencies in the visual processing that interfere with the successful growth of the reading skill

In order to detect these children, a picture reading test was devised.

The speed of visual perception has attracted the interest of many researchers. Broverman[18] and Drake[19] distinguish between the normal and retarded readers in their ability to perform simple repetitive tasks rapidly regardless of whether they were perceptual or conceptual in nature. They believed that the critical feature in normal reading is the "automatic performance of decoding, leaving the reader free to concentrate on the moaning. . ." Doehring[20] studied the difference between normal and retarded readers and found that simple tasks of speed of letter recognition distinguished between the two groups. He cautioned educators who refer to the retarded readers by the label SPECIFIC READING DISABILITY as though the act is purely a reading phenomenum without any physiological or perceptual correlates. A more detailed description of the tests employed by the three authors appears in the appendix. A review of this literature shows that perceptual speed seperates the children studied into the two groups of normal and retarded readers to a level of confidence greater than .001

The K.S. VPST employs pictures of the hand and arrows as its targets. These targets were selected because they could be used with kindergarten children and very poor readers. The subject must tell how many fingers he sees and tell when the arrows are pointing UP DOWN RIGHT or LEFT. Pictures of the hand make a greater demand upon the visual perception than letters (0.85 - 0.50) thus they can be more selective.

In order to secure normative data, the children of a primary school were tested.

Population: 323 children ranging in age from 6 to 13 from grades one to seven were tested. They came from northern New York State from an urban area of mixed socioeconomic status that ranged from lower middle class whose parents had grade school or high school education to professional class where parents were university graduates and were engaged in the professions or management. Intelligence range was from 85 to 140. Measures that were available from school data. Reading range was from .5 to grade 11.

TESTS GIVEN:

Keystone Visual Skills Test:

Simultaneous vision, fusion, stereopsis, usable vision, color vision, and muscle balance.

KIRSHNER SAROJ TEST OF SPEED OF VISUAL PERCEPTION (see appendix)

Card one speed of reading pictures of hand with BOTH EYES

Card two " " " " " " " LEFT EYE

Card three " " " " " " " RIGHT EYE

Card four " " " " " " " SUPPRESSION
is indicated when the subject fails to read a target presented to each eye individually.

Card five speed of naming the directions of arrows UP DOWN RIGHT LEFT.

READING TESTS: Reading readiness tests for New York State.

ADMINISTRATION OF THE TEST:

The cards are placed in the stereoscope at the reading distance. A short demonstration test is given to acquaint the student with the test. The demonstration test is given with a test card that is used outside of the instrument. Ask the student to read as quickly as possible. "HERE IS A CARD WITH PICTURES OF THE HAND. HOW MANY FINGERS ARE SEEN IN THE FIRST PICTURE, IN THE SECOND, GOOD NOW READ ALL THE PICTURES AS QUICKLY AS POSSIBLE WHILE I TIME YOU WITH THIS STOP WATCH".

On the other side of the card is pictures of the arrow pointing UP DOWN RIGHT LEFT. "LOOK AT THE FIRST ARROW. IS IT POINTING UP, DOWN, RIGHT, OR LEFT? GOOD, NOW TRY THE FIRST ROW AND TELL ME HOW THE ARROWS ARE POINTING. DO THIS AS QUICKLY AS POSSIBLE WHILE I USE THE STOPWATCH".

The ARROWS TEST is a quick screening for directionality. The test may serve as a probe into the directionality of the student by comparing the test of binocular reading of the hands with the arrows.

PERCEPTUAL SPEED AND READING

The data show that perceptual speed is significantly related to reading ability and that it follows a developmental trend. The intercorrelation analysis of three hundred and twenty three children gives a Pearson Product correlation of 0.54 for binocular reading; 0.58 for left eye and 0.55 for right eye. These figures are significant to the level of confidence of 0.001.

Those children who are reading at or above grade level have a mean binocular score of thirty six seconds, whereas those children who are reading below grade level have a mean binocular score of sixty two and nine tenths seconds. (Fig. 2)

BINOCULAR VISION AND SPEED OF PERCEPTION

To measure the binocular vision status, the Keystone visual skills test was employed. The test of fusion, muscle balance and depth perception show that 12.5 percent of the children fail these tests when the picture reading rate was ator above age level, while 28.5 per cent fail the test of binocular test when the speed of the one eye is superior to two eyes by five seconds or more. Thus children who are slow in perceptual speed and who show the superior rate with one eye rather than two eyes, one third of the group has a measurable binocular interference. The number of children tested in this group was fifty eight and the age range was from 6 - 7.9. It would appear from the above data that binocular vision status may affect the rate of reading pictures. It would seem reasonable to treat these binocular difficulties in conjunction with a remedial reading program. (see appendix)

The purpose of this study is to draw attention to the need for a more detailed investigation of the visual status of children who fail in reading. Routine eye examinations of acuity and optical status are clearly not enough to investigate the complex process of reading which requires skilled ocular motility the student moves from word to word and makes a return sweep to the beginning of the next line. Measures are taken to find out if the following conditions exist: (a) Focusing flexability that enables quick change from the chalkboard to the book. (b) Sufficient focusing and convergence ability to maintain the eyes in the reading posture for hours at the time. Some studies show significant gains in reading ability when visual training is given. (1,2,3,4,5,6,7,8,9,10,11)

THE LONG TERM EFFECTS OF REMEDIAL READING

Balow (13) conducted a study of the long term effects of remedial reading instruction. He found that whereas (Fig.3) children made rapid gains during the period of instruction showing ratios of growth of 6/1 six months of gain during one month of instruction, within one year after these impressive gains their rates of growth dropped below the mean for the group. So that they were once more failing below the level of their peers. A British study of remedial gains and a subsequent follow up was reported by Lovell, Bryne & Richardson(14). The average reading gain was two years for an instructional period of one year. Retesting at 12 and 16 months after the training, the pupils were dropping below the average for their grade.

Another study by Johnson and Platts(15) surveyed 284 pupils who had received instruction. After two years their growth in reading was slower than their growth in age. The author conludes that "severe reading disability is a relatively chronic illness needing longterm treatment"...what factors were absent from the training program when these children were referred for remedial reading? The success in long term effects of remedial reading that is accompanied by visual training bears investivestigation by the serious student of reading disorders.

VISUAL TRAINING NO PANACEA

While the Visual Perceptual Speed Test is significantly related to reading (.001) it only accounts for approximately 25% of the variances. This is in keeping with the Gibson model of four factors. It is for this reason that visual training to increase perceptual speed is not a panacea but must be considered as part of the total remedial program, in appropriate cases. Solan (16) calls for an end to the artificial dichotomy of perceptual handicap and reading disorder and recommends a combined approach.

APPENDIX I

Tests employed by Drake et all and Doehring to measure autom-itization or speed of perception of overlearned material. Pictures of of objects, letters, numbers and simple geometric forms.

Drake employed the following tests: - Repeated Objects: A white card with rows of pictures of FLY TREE CUP appearing in random order in rows across a page 8 x 11, one hundred pictures.
STROOP COLOR NAMES: The color names red, green and blue were printed in black ink in random order across a card of 8 x 11 one hundred names were used.
STROOP HUES: Color patches of red, green and blue appearing in random order on a card of 8 x 11 one hundred patches were used.
STROOP INTERFERENCE: The color words red, green and blue each printed in an ink the color of which is not consonant with the color name. Subjects must name the color of the ink and not read the name of the color.
When the performance of 30 normal and 30 retarded readers was compared, it was found that the normal readers were superior to the poor readers to a level of significance greater than .001 (I)

Appendix 2

Doehring in his book Patterns Of Impairment in Specific Reading Disability measured the perceptual speed of his subjects to determine if these tests could distinguish between the normal and retarded reader. He found that timed tests where the scores were determined by the number of correct responses in a given time or the amount of time required to complete a given number of responses, even though the tests involved relatively simple letter and number stimuli for which reading was not essential, the Normal Readers were significantly superior beyond the .001 level on the following tests: - Digit Symbol. 67 digits preceded by a code. TRAIL MAKING TEST (Reitan 58) 25 numbered circles distributed over a sheet of paper. The circles are connected by a pencil line in correct sequence. SINGLE LETTER. The letter "s" interspersed among 360 randomized letters. SINGLE LETTER IN SYLLABLE CONTEXT 162 four letter syllables in which 47 contain the letter "e". TWO LETTERS subject must underline letters "b" & "m" within a time limit. SEQUENCE OF GEOMETRIC FORMS triangle, circle cross crescent subject had to underline a specific sequence of forms. FOUR LETTER NONSENSE SYLLABLES (unpronouncable and a group of pronouncable syllables).

APPENDIX 3

TARGETS

BINOCULAR

LEFT EYE

RIGHT EYE

SUPPRESSION

DIRECTIONS

Appendix 4

KIRSHNER SAROJ TEST OF SPEED OF VISUAL PERCEPTION

RELIABILITY: To determine the reliability of the Kirshner - Saroj VSP Test, twenty-six students of mean age 8.7 were tested and retested 48 hours later by the same examiner. A reliability coefficient for each test is presented in table I. All r's were found to be significant to p .001

BINOCULAR READING	LEFT EYE	RIGHT EYE	SUPP. DIRECTION	
.9734	.8697	.9921	.9852	.9943

DEVELOPMENTAL STUDY OF SPEED OF VISUAL PERCEPTION

Changes in speed of perception with age show a developmental trend from 1.8 seconds per picture to .85 sec. or changes from 66 seconds to 30.88 in the time required to read 35 pictures. (Figure (I) appendix page 8.

Appendix 5

VALIDITY: The validity of the Kirshner Saroj VSP Test is the ability of the test to discriminate between normal and retarded readers. Two groups of readers were selected from our sample those who were above the grade average in reading and those who were below. The mean VSP scores were calculated for each group. Age of group was 8.0 (mean) s.d. .11

	READING GROUP ABOVE GRADE LEVEL	READING GROUP BELOW GRADE LEVEL
VSP	36.0 seconds Binocular	62.9
sig. P .001		

FIGURE 2

INTERCORRELATION ANALYSIS OF 323 SCHOOL CHILDREN BETWEEN READING AND VSP TEST.

BINOCULAR	LEFT EYE	RIGHT EYE	SUPPRESSION	DIRECTIONALITY
-.5452	-.5874	-.5580	-.3796	-.4125

p.

Appendix 6

RELATIONSHIP BETWEEN PICTURE READING TEST AND KEYSTONE VISUAL SKILLS:

To study the relationship between visual efficiency as measured by the Keystone battery and picture reading, the number of failures on the Keystone test was related to the speed of picture reading. The age range of the children was 6 - 7.9. Number of children 58.

ABOVE AVERAGE PICTURE READING RATE	BELOW AVERAGE *
12.5% fail keystone Tests	(1) 28.5% fail keystone (2) 33% " "

* The picture reading rate was below the mean for the age (1) and the monocular reading was superior to the binocular rate by 10 seconds or more. (2)

The data indicates that when children show a slow rate of picture reading and binocular stress, they tend to have greater difficulty on the binocular measures of the Keystone battery.

APPENDIX 7

NORMS AND EXPECTEDS

The Saroj classification of learning disorder, children whose findings are one standard deviation below the mean have mild learning problems. Children with two standard deviations below mean have severe learning problems. (17)

EXPECTEDS

	age 6	age 7	age 8	age 9	age 10	age 11	age 12
Below 2 Std Dev.	98 sec	91	67sec	56.5	53.8	53.5	50.9 sec
1 std Dev.	82	73	53	46.5	44.8	44.5	40.9
mean	66	55	39	36.5	35.8	35.5	30.9
std Dev above	50	37	25	26.5	26.8	26.5	20.9

Speed of picture reading with two eyes. (hands)

Passing score from mean to 1 standard deviation above.

BINOCULAR STRESS

Two eye score is 5 seconds or more longer than Right or Left eye scores

Example boy age 8 Binocular score 45 Left eye 39 Right eye 44
The left eye score is significantly faster than the binocular score.

SUPPRESSION.

The underlined numbers indicate the hands seen only with one eye. Odd numbers indicate right eye suppression Even numbers indicate left eye suppression. (figure)

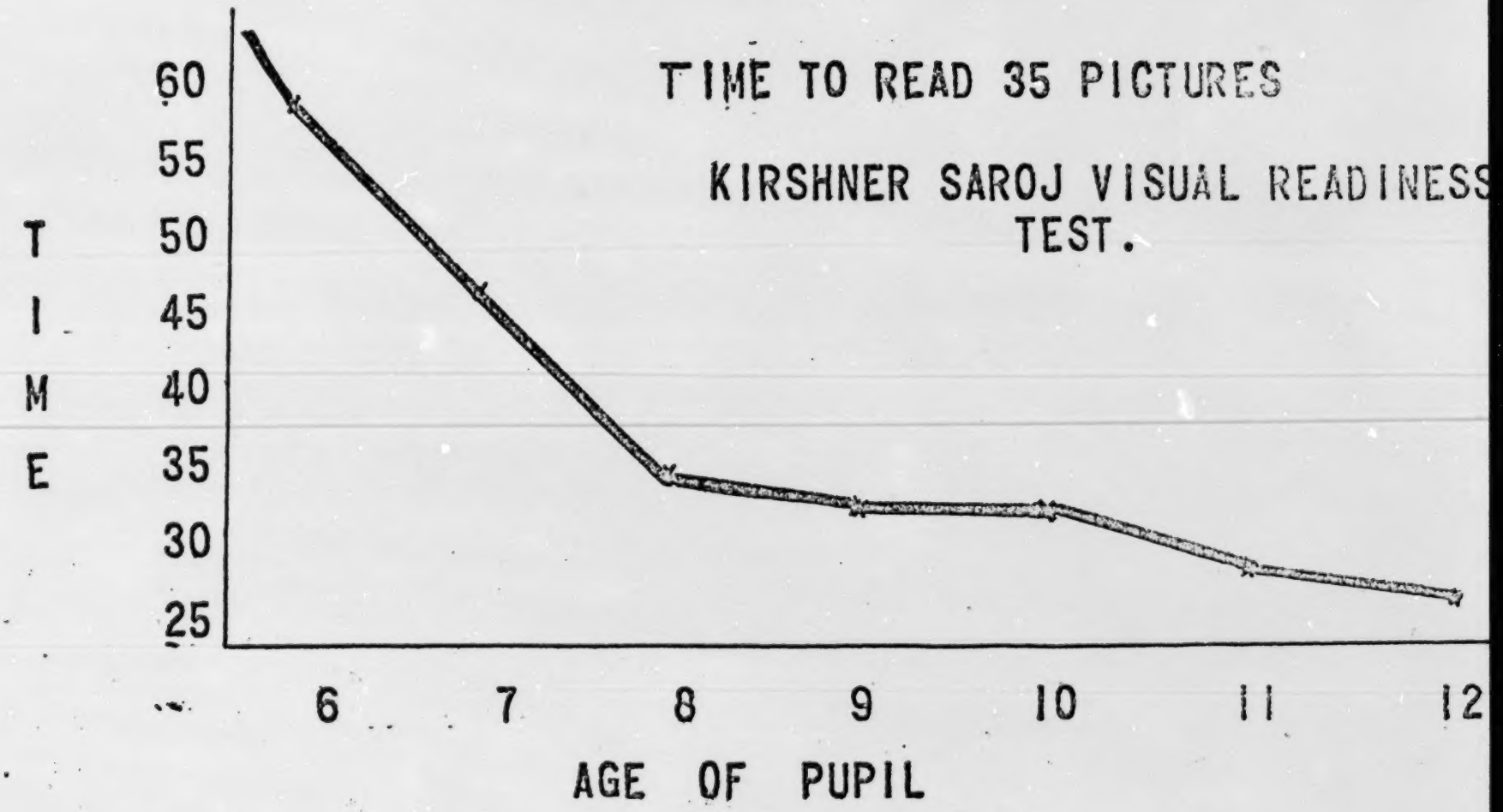

TIME TO READ 35 PICTURES
KIRSHNER SAROJ VISUAL READINESS TEST.
T I M E
60
55
50
45
40
35
30
25
6
7
8
9
10
11
12
AGE OF PUPIL

FIGURE I.

KIRSHNER SAROJ TEST OF VISUAL READINESS

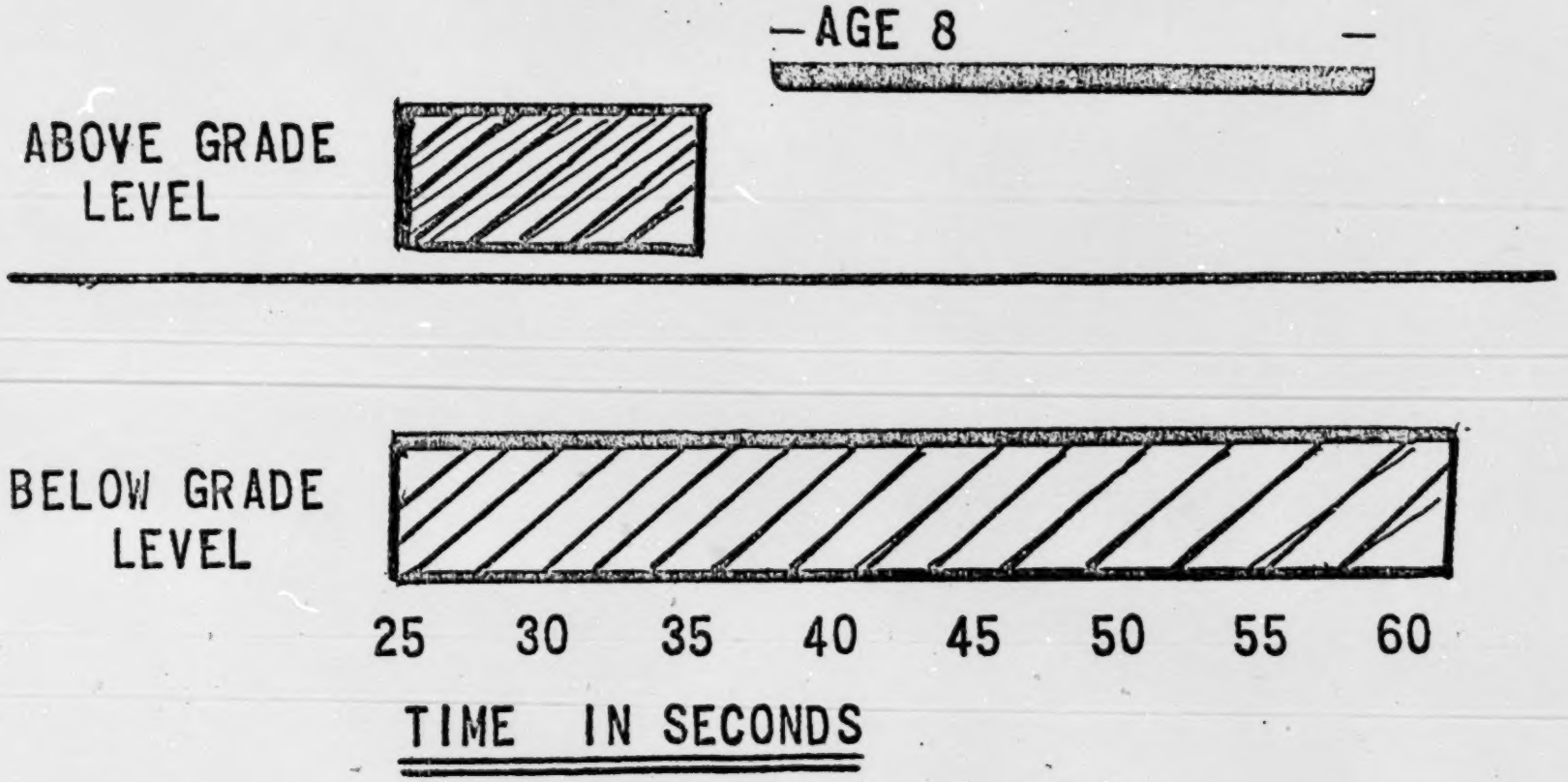
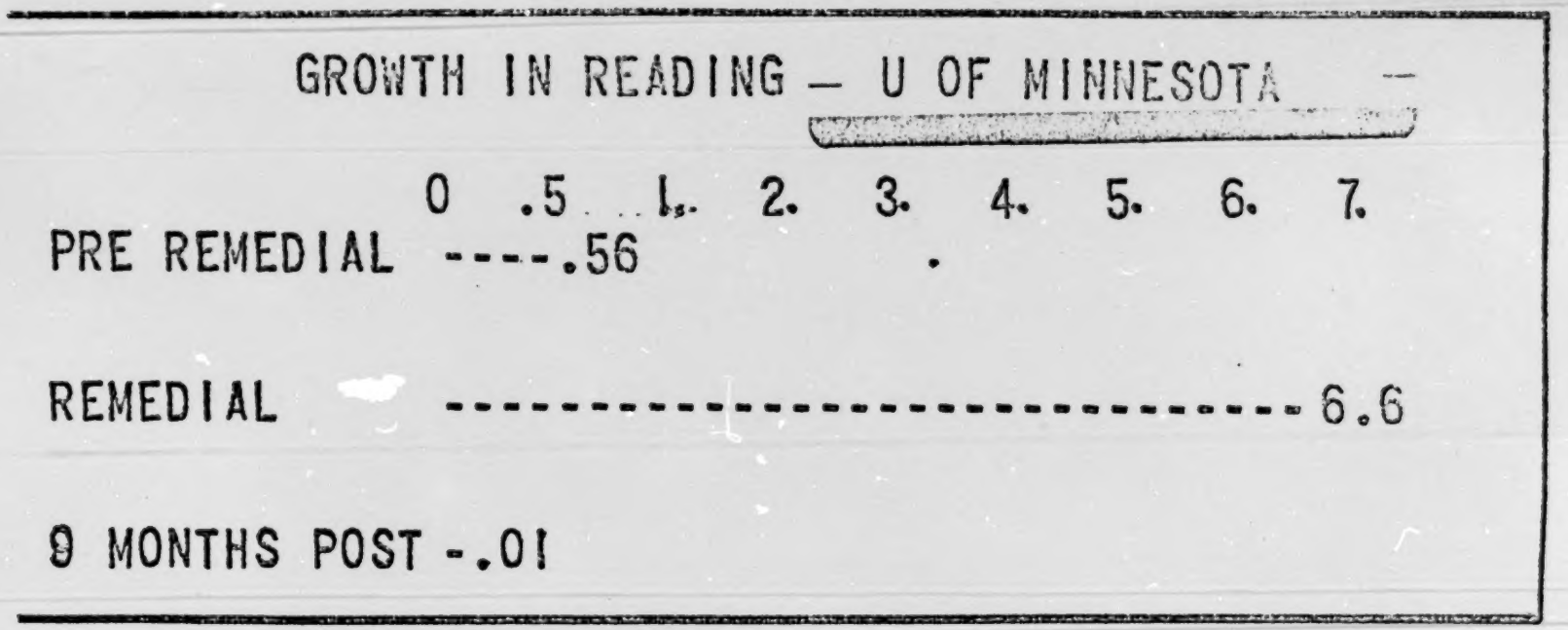


FIGURE 2



I EQUALS ONE MONTH GROWTH PER MONTH OF INSTRUCTION

AFTER BALOW

READING TEACHER APRIL 1965

FIGURE 3.

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